UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

MONTHLY REPORT OF THE OFFICES OF FOREST EXPERIMENT STATIONS AND DENDROLOGY

SEP 1925

GOVERNMENT PRINTING OFFICE

8—5156

RS
Reports
Monthly

MONTHLY REPORT OF THE OFFICES OF
FOREST EXPERIMENT STATIONS AND DENDROLOGY

September, 1925

FOREWORD

(Continued from the August issue)

Advantages of a Program of Work

To the individual research worker. There is a viewpoint, which has often been publicly expressed in the past, that research is individual in character, and that the research worker is frequently and often needlessly hampered by administrative policies, oversight, and organization. There can be no question that much of the successful research at our experiment stations in the past has been due to the brilliant ability and untiring enthusiasm of the individual scientists who initiated these researches because of their personal interest in the particular problems with which they were concerned. The opportunity for the exercise of individual initiative and a reasonable wide range of freedom in research should undoubtedly be preserved. But the time has come when the successful development of American agriculture demands scientific and organized study of many problems which are too broad in their scope to be attacked by single minds. The publicly-supported experiment stations are the agencies which rightfully should engage upon such organized studies, enlisting the combined interest and attack of men trained in all of the sciences which can contribute to the solution of the difficult and complex problems which now confront the industry.

Will the development by the station of an organized plan of attack upon such problems seriously limit or hamper the individual research worker in his freedom of thought and effort? A fairly definite station program may, to be sure, discourage impulsive undertaking of new studies and emphasize the importance of continuing investigations which are under way until they have been brought to the desired conclusion. But is this a real loss to the individual investigator? The pressure of modern science toward narrow specialization tends to limit the field of vision of the individual worker and to a degree to disturb his sense of proportion. Some of the recent examples of faulty conclusions, because of too narrow a viewpoint in the planning and conduct of the investigations, emphasize the danger of individual isolation of thought and study, and the importance of breadth of view and wideness of experience in the planning of research work. It is just this broadening influence which participation by the individual in a general plan or program tends to promote.

Also, many individual workers will undoubtedly experience an added enthusiasm for their work if they know that it is a part of a well-considered and generally-approved plan of public service. And certainly it will give to many a worker who has experienced the vicissitudes of uncertain funds and inadequate equipment an added sense of security to know that his work is a part of a general plan for which public approval has been secured and for which continuity of support has been insured.

Finally, most individual research workers would undoubtedly profit by a definite program, which serves both as a guide to future planning and considered both from the standpoint of additional projects in fields of work already represented by existing departments, and from that of apparent needs for investigations in new fields or by new agencies or technique.

In general, the final formulation of the program should recite: First, an outline of the general fields of research work in which it is proposed that the station shall engage; second, some general statements of the nature of the projects to be undertaken in these several fields; and, third, a review of the facilities which are available, or will be needed as additions, in order to make possible the satisfactory carrying-on of the proposed program. The detail to which the discussion of any of these matters should be carried will vary with the different conditions which the program itself is designed to meet. And, as a matter of expediency, any public presentation of the program, in printed form or otherwise, should always contain provision for its modification or expansion to meet emergencies which may arise, and such qualifications as to its binding effect upon the station or the State as experience in dealing with such matters may suggest.

It should be clear to all that one of the principal purposes of such a program is to serve as a general guide by means of which both the administration of the station and the people of the State, especially as they are represented in the legislature, may determine whether the plans and budgetary requests of any given year are in harmony with and a part of a well-worked-out and publicly-approved plan. Such a plan ought not to be so specific and so inflexible as to become a hindrance rather than a help to development of the station's attempt to meet the needs of the State for agricultural research as they arise. But if wisely prepared and intelligently followed it should serve a most useful purpose in promoting the welfare of both the station and the State.

Recommendations

In view of the discussions presented in this report and of the opinions and experiences of several directors of which the committee has had the benefit during its consideration of these matters, your committee now recommends that each individual station should undertake to outline a general program for its work and future development. Such a program should cover a period of several years, but should provide for periodic reconsideration

and amendment. It should be prepared with the understanding that its terms are subject to modification or amendment as emergencies may arise or conditions change; but with the understanding that it is to serve as the general guide to the station staff, the administrative authorities of the institution, the legislature of the State, and the general public in the development of the working facilities for the station for the period covered by the program itself.

FOREST EXPERIMENT STATIONS
Washington

Mr. Clapp spent most of the month in Districts 2 and 3, and will not return to Washington until after the middle of October.

Munns visited the Rocky Mountain Station early in the month, where he and Bates went over the Wagon Wheel Gap project thoroughly on the ground and made plans for the continuation of the experiment. Munns spent the rest of the month with Pearson, both in the office and in the field.

During the past month most of the work of the Section of Forest Measurements has been spent upon the southern pine growth study. This study continues a fruitful field for investigation into mensuration methods, for the amount and character of the data are such that new methods are necessary to get anything at all from the material.

As September has been a vacation month, no work was done on the western yellow pine volume tables. Some help was given to Mr. Boyce in his stumpage price study and the tabulating section has also been able to render him some assistance on his lumber price study. The urgent part of the compilation of activity costs for the Forester's Report has been practically completed.

Mr. Bruce, on furlough since the first of September, is located in the Albee Building, this city, as eastern representative of Mason and Stevens.

LIBRARY

During September there were 910 loans of books and periodicals from the library, and 83 members of the Service and others consulted the library in person.

There were 261 books and articles indexed for the library catalogue last month.

and amendment. It should be prepared with the understanding that the terms are subject to modification or amendment as emergencies may arise or conditions change; but with the understanding that it is to serve as the general guide to the station staff, the administrative authorities of the institution, the legislature of the State, and the general public in the development of the working facilities for the station for the period covered by the program itself.

[illegible]

Washington

Mr. Clapp spent most of the month in [illegible] and will not return to Washington until after the middle of October.

[illegible] visited the Rocky Mountain Station early in the month, when he and Bates went over the Wagon Wheel Gap project thoroughly on the ground and made plans for the continuation of the experiment. He spent the rest of the month [illegible], both in the [illegible] and in the field.

During the past month most of the work of the [illegible] Measurements has been [illegible] study. This study continues a fruitful field for investigation into computation methods, for the amount and character of the [illegible] are necessary to get anything [illegible].

As September [illegible] western yellow pine volume [illegible] his stumpage price study [illegible] to render him some assistance on his [illegible] of the compilation of [illegible] practically [illegible]

Mr. [illegible] in the [illegible] Building, this city, [illegible] and Stevens.

LIBRARY

During September [illegible] the library, and 53 per cent of the [illegible] in person.

There were 381 books and articles indexed [illegible] last month.

EDITOR'S OFFICE

Lest too many editorial cooks overseason the rhetorical broth, the Research editor will this month defer to the Public Relations editor to the extent of recommending very highly the contribution to the SERVICE BULLETIN of October 12 entitled "I Take My Pen in Hand." This rose by another name smells just as sweet to the present writer. We called it "hyfalutin," you remember; and Everard calls it "maximum language." The only difference is in the name; it is the same absurd, cumbersome, doughy kind of writing. And Everard has explained with delightful definiteness just what "maximum language" is - not a deficiency in the art of writing, but for the most part lack of "clear, hard, complete thinking."

LAKE STATES FOREST EXPERIMENT STATION

The staff spent most of the month in the field in connection with their respective studies, Kittredge on the Minnesota and Superior National Forests studying the possibilities of the aspen-birch type, Wackerman in the swamps north of Duluth determining the effect of drainage upon timber growth, and Brown and Koroleff in the Upper Peninsula of Michigan on the project of the comparative cost of logging small trees versus large trees.

Zon visited some of the field work in Michigan, but spent most of the month in traveling with Clapp and later with Sparhawk through Michigan and Wisconsin, partly showing the work of the station and partly laying out plans for economic studies to be undertaken by Sparhawk in Wisconsin next field season.

Mitchell spent two weeks in the field with Mr. Pimley of the State Forester's office visiting the various forest officers who are cooperating on the Fire Weather Project and checking up on their observations. Incidentally a new cooperative station was established at Washkish on Upper Red Lake. This makes 12 stations now reporting directly to the Experiment Station. These stations are all equipped with psychrometers, while at Cass Lake, Cloquet, and Ely, hygrographs are in operation. In addition, barometers have been installed in a number of places by the State forest service and rain gauges have been ordered for all stations not already so equipped.

A growing interest on the part of the State forest service in the Fire Weather Project has led to the outlining of a number of cooperative experiments to determine the conditions under which fires will start; also how they behave under different conditions. So far, however, rain and high humidities have prevented their being carried out.

During the month the humidity data from the various cooperative stations has been tabulated and plotted to date. The importance of relative humidity was strikingly brought out by the Cass Lake record for May, the worst flare-up of the season being preceded and accompanied by extremely low humidities, the hygrograph registering a minimum of one per cent the day preceding the worst flare-up. This is probably lower than the humidity actually was, due to instrumental error under extreme conditions. It serves, however, to indicate the existence of emergency conditions.

Fortunately for the fire situation, September brought abundant precipitation throughout the fire districts, so that the situation which was critical the last of August has been relieved and unless unusual conditions develop, the fall season promises to be short and of only moderate intensity. The records of the last ten years show the peak of the fall fire season to occur the last ten days of September. This being the case every day that fires hold off lessens the danger of a serious outbreak this fall. So far high humidity has been the rule and few fires have been reported.

Among the visitors during the month were W. N. Sparhawk and H. N. Wheeler of the Washington office; J. F. Preston of the Hammermill Paper Company, Erie, Pa.; D. A. Crocker of the American Paper and Pulp Association, New York; George A. Duthie, Supervisor of the Black Hills National Forest, Deadwood, S. D.

CLOQUET FOREST EXPERIMENT STATION

The field work on the birch-aspen study was completed and Probstfield is now in the office getting the data in shape.

The report on the five years of observation on planting is practically finished.

The exhibit used at the Exposition in Duluth was shown at the State Fair as a part of the Cloquet exhibit in the State Auditor's booth. A small woodlot exhibit was also prepared for the two-day Fall Festival at Cloquet.

Visitors, mostly tourists, have been numerous at the station this month. A delegation of 50 engineers from Duluth inspected the Station during a visit to the Cloquet industries. Messrs. Diemer and Erickson from the Madison Laboratory and Mr. Sparhawk from the Washington office visited the Station.

NORTHERN ROCKY MOUNTAIN EXPERIMENT STATION

Mr. Clapp made us a visit of four days this month. Trips were made to the Priest River Branch and to the proposed experimental center on the Coeur d'Alene Forest. The chief subjects discussed were fire studies and the development of our experimental work at the branch stations.

The white pine methods of cutting study, upon which Haig, Marshall and two field assistants have been engaged, was conducted on the Coeur d'Alene Forest during the entire month. Transects were run on a number of timber sale areas, most of which were 10 to 15 years old. Various methods of cutting were tried out on the early sales on the Coeur d'Alene Forest including selection, shelterwood, clear cutting in strips and clear cutting with seed trees. Solution of the hemlock problem was attempted by a method of cutting in which this species was girdled. Weidman spent five days running strips with the crew. Only the most general statements are warranted from the work to date. In general, it may be said that the best reproduction, from the standpoint of amount, size and desirable species, is found on areas where some form of clear cutting was practiced. The poorest condition with regard to reproduction is found where there was a residual stand left after cutting. This is particularly true where a fairly heavy stand of hemlock and white fir is left on the ground. In general, it may also be stated that regeneration on south slopes has been very unsatisfactory on nearly all the sale areas studied to date.

One of the timber sale areas studied while Weidman was with the crew was an example of strip cutting. All the timber was cut 16 years ago on a strip 200 feet wide by 500 feet long, approximately. The strip lay up and down a slope on two sides of a creek, about half on one side and half on the other. The original stand on the north slope ran very heavily to white pine with a comparatively small mixture of hemlock and other species. On the south slope the original stand was white pine, white fir, Douglas fir, and western larch, in approximately equal amounts. Seeding, of course, is going on from both sides and the ends of the strip. On the north slope the ground is densely and uniformly stocked with reproduction in the amount of 141,000 seedlings per acre. This ranges from 1 to 16 years of age and from an inch to 5 or 6 feet in height. White pine comprises 8,200 seedlings per acre; hemlock, 122,600; white fir, 9,000; cedar, 1,000; Douglas fir, 200. On the south slope two-thirds of the area is stocked with a scant cover of reproduction and one-third is absolutely lacking in seedlings. There is a dense cover of brush on this area, chiefly Ceanothus and willow. On the portion of the area stocked with reproduction there are 1,490 seedlings per acre, including 370 white pine, 620 white fir and 500 Douglas fir seedlings. The ages vary from 5 to 14 years and the greatest height was about 2 feet. In considering these figures with relation to conditions on the ground, one is chiefly struck with how misleading figures may be in giving an idea of the adequacy of the amount and condition of reproduction. In looking over this sale area the reproduction on the north slope would be pronounced satisfactory. It is

evident to the eye that there is more hemlock than is desirable but the white pine seems to be adequate in amount and spacing to make a very good young crop of white pine timber, considering its ability to outstrip the hemlock in height growth. Yet, from the standpoint of the actual figures, 141,000 seedlings per acre is an appalling number. On the south slope, on the other hand, the figure of 1,490 seedlings per acre would appear to be a very adequate amount of reproduction. To the man on the ground, however, it is very clear that the reproduction here is absolutely unsatisfactory. Here is a sale area 16 years since cutting with a very scant showing in the way of reproduction, despite the fact that the number amounts to nearly 1,500 per acre.

Gisborne was fortunate in being able to carry his study to going fires again this month. Two days were spent on a fire near Priest River and seven days on the Bear Creek fire east of Priest Lake. Here he took measurements of relative humidity, temperature, wind, and duff moisture, and made observations on the behavior of fire in relation to the various influencing factors. With the coming of rain at the end of the third week of September, the fire studies work at the field station was closed and Gisborne returned to Missoula.

At Savenac Nursery Wahlenberg spent the first week in September in the study of root control in seed beds. Samples of six lots of 2-0 yellow pine grown under different conditions of soil fertility were washed out of the ground and the root systems were examined in the laboratory. The work clearly indicates the modification of root form in the desired direction, but the success of the work cannot be definitely stated until the results of field plantations are known. It is the plan to test the survival of this modified stock in the field, planting 2-0 yellow pine this fall and 3-0 white pine next fall.

At the time of writing this, planting has been started elsewhere in the District, but it will not be possible to plant here until more rain falls. Good progress has been made in the examination of plantations set out last fall and last spring. In the nursery a bed of white pine was sown. This is to be used for a detailed study of seedling losses during 1926.

Mr. Lloyd Austin of the recently established "Eddy Tree Breeding Institute" visited the nursery on September 20 and selected trees from the seed beds for his experiments. He was interested in the tree measurements taken here, and was especially glad to get the results of our work in the grading of yellow pine seeds.

At the Priest River Branch progress in our regular investigative work was again halted by fire fighting. Kempff and his field assistant spent an aggregate of a little over two weeks on fires. This, by the way, brings the total amount of fire fighting engaged in by experiment station men this summer to 112 man-days. This does not include the time spent by Gisborne making observations on going fires. After catching up on station maintenance work, Kempff and Diekmann were able to put in some time in the establishment of a few of the sample plots planned for this season.

Weidman spent a week at the station partly on measurements of existing plots and partly, in company with Kempff, reconnoitering suitable sites for yield and methods-of-cutting sample plots. A number of localities for white pine and Douglas fir plots on different sites were visited on the experimental forest and several trips up to 25 miles distant from the station were made to look up sites for methods-of-cutting experiments in 100 year-old and 200 year-old stands.

PACIFIC NORTHWEST FOREST EXPERIMENT STATION

Mr. Clapp spent almost a week in Portland, dividing his time between the Station and the District Office of Products. He helped us get lined up for the coming year and left us with added enthusiasm for our jobs.

All members of the force have been in the field much of the month, but all have been in the office part of the time, except Simson. He was on leave the last two weeks, during which time he visited Priest River Branch Station to discuss ground fire studies with Gisborne.

The field work of the Douglas fir yield study is completed. One crew returned to Portland September 12 and was disbanded, and was followed on September 16 by the other crew. This gives a grand total for the seasons of 1909, 1911, 1924, and 1925 of 2,024 plots, of which 914 were measured this year. Computation of the field data was begun September 16, employing a temporary clerk for the purpose, the first of which is the drawing of diameter-average height curves, and computations of basal areas for the 1925 plots. It is planned to punch most of the data on cards and make use of the sorting machine at Washington for much of the computational work.

One of the yield study crews and McArdle spent a profitable day and a half in experimenting to find the relationship between caliper and diameter tape measurements of Douglas fir. Several thousand trees were measured in the course of this study. McArdle concludes that the diameter tape gives results which are far more consistent than those which can be obtained with the calipers - even though the tape is read only to the nearest inch of diameter. With either calipers or tape, most men can check their own measurements very closely, but the peculiar advantage of the diameter tape is that with it one man's measurements are quite as good as those of another, but with the calipers the discrepancy between measurements of several men is considerable. With Douglas fir, the diameter tape yields results about 1.3% higher than the calipers.

McArdle also spent several days on a reproduction study collecting data to be used in revising the existing table for age corrections in Douglas fir.

Isaac, with field assistants, devoted the entire month to the periodic measurement of the Douglas fir seed study plantations. These plantations were established in various parts of Washington and Oregon in 1915 and have now reached a sufficient size to bring out striking contrasts in the stock grown from seed of various sources. The experiment also brings out the effect of site. Best growth was found in the Siuslaw plantation where the largest tree was 23 ft. 6 inches, while the poorest growth was found on the high altitude Mt. Hood plantation, where the tallest tree was 6 ft. 9 inches.

Twice during the month the "Distance of Seed Dissemination" experiment at Scappoose, Oregon, was visited and the seed removed from the catchers.

Dr. Kienholz went back to the University of Illinois early in the month, after a summer profitable both to himself and to us. He took with him some Wind River soil, duff and ashes, and some Douglas fir seed, with which to continue some fundamental study of phases of reproduction this winter.

The yellow pine brush disposal study took practically all of Westveld's time, the first two weeks on the Crater Forest and then ten days in the office in Portland. Thence he left for the Blue Mountain Forests to get in on the fall brush burning, going by way of Wind River to pick up the Ford and see a bit of the work there.

A most interesting day was spent by Munger visiting with Dean Winkenwerder the Cedar River watershed from which Seattle gets her municipal water supply and part of her hydroelectric supply. The city owns a big acreage of logged-off land and has called in Winkenwerder as consulting forester. A nursery has been started this year and a planting program is under way for the badly denuded lands. The Director also went to Puyallup to get acquainted with the men at the Western Washington Agricultural Experiment Station.

One trip was made by Munger to Wind River, where he was joined by Mr. Dague, fire weather specialist of the Weather Bureau.

SOUTHWESTERN FOREST EXPERIMENT STATION

Krauch made a trip to the Santa Fe and Carson, September 10th, meeting Bates and a party of planting men from District 2, in order to study the Engelmann spruce of that region. Engelmann spruce from the Santa Fe, several years ago, produced exceptionally vigorous seedlings at the Monument nursery. A question has arisen as to whether the seedling might be blue spruce or possibly a hybrid of blue and Engelmann. Seed was collected from typical trees of both species with a view toward testing them out in the nursery.

Pearson spent a week on the Prescott, tagging and measuring the trees on the thinning plots. A thinned plot of 4 acres has approximately 150 trees per acre, from 8 to 11 inches D.B.H. About 3 inches of rain fell during the week, interfering considerably with the work.

A Douglas fir planting area, established in 1911 and fenced with Page wire, was recently found to have been broken into and used as a bed ground for a bunch of sheep. This area was treated in the same way back in 1915. Nearly every tree has been badly damaged, those less than 3 feet tall being practically defoliated. A near-by meteorological station, also fenced with Page wire,has been used this summer as a pasture for the sheepherder's burros. Sheepmen in Arizona habitually practice such acts of vandalism with impunity, as many farmers will testify. Verily, the sheep is a sacred beast in this country.

Munns spent the last week of the month at the Experiment Station and on October 1, Munns, Marsh and Pearson started on a tour of Southern Arizona to study erosion, mainly on the Roosevelt watershed.

ROCKY MT. EXPERIMENT STATION

September Activities

Bates and Roeser spent four days, terminating Labor Day, on a trip to the Santa Fe and Carson, accompanied by Keithley and Schrader of the Pike Forest, in charge of planting and nursery work, respectively. The object of this wholesale pilgrimage of experts was the so-called "Santa Fe Engelmann Spruce," whose phenomenal growth in the Monument Nursery and its great vigor in the field has made all forms of Colorado Engelmann shrivel into insignificance for the past ten years. Believing that no one could possibly mistake blue spruce seed trees for those of Engelmann, would-be tree breeders have been interested in this form as a possible hybrid lacking the distinguishing characters of either species, but with much of the weedy energy of the blue ancestor. Alas! Examination on the ground shows the two species growing in mixture (of stems, not qualities) each as distinct as in Colorado, and discloses the fact that in such stands the hoarding squirrels quite largely ignore the puny Engelmann cones. Hence, 2 million blue spruce trees planted from the Monument Nursery where none grew before. It is believed that seed collected from individual trees will show conclusively that New Mexico Engelmann has the same slow-growing qualities as our native forms, and that we must resign ourselves to using the native form, which every study so far has shown to be preferable in a region which demands hardy qualities.

Not far removed from the same subject is a small test conducted during the month to determine whether certain trees, in attaining dominance over their neighbors of the same age, do so by short-cut methods, or, in other words, by producing flimsier wood of greater volume. If so, the selection of rapid-growing individuals as the source of seed for future generations of trees may not be as much of a boon as it appears.

The evidence so far obtained indicates that the more rapid-growing specimens of Engelmann spruce do produce lighter wood, but there are several factors to be considered, of which crown area, rather than diameter and height, is probably the most important.

The Station force was greatly stimulated by a 10-day visit from Munns, beginning on the 9th. Besides visiting the Wagon Wheel Gap branch at a time when his inspection was most needed, Munns spent several days in the office with Bates discussing general problems and going over the Editors' criticisms of the lodgepole seed report. Agreement was reached on practically every point and the report should not now be much further delayed after Bates has been able to incorporate the suggested changes, which will not be until the close of field work, or about the end of October.

Owing to the practical failure of the transpiration tests conducted this year, new ones are being started on an entirely different basis, the aim being to obtain more natural conditions for prolonged seedling growth.

October Plans

Mr. Clapp's slightly delayed visit is expected in the early part of the month. At Wagon Wheel Gap it is expected that Junior Forester Anderson of the Leadville will assume duty for the Forest Service under Mr. E. L. Hardy of the Weather Bureau, the latest decision being that the Weather Bureau will not drop out entirely until two years' additional records have been obtained.

At Fremont Bates will be engaged in putting a new tolerance test under way and in determining just what has been accomplished in the current transpiration tests, this involving the unpotting and careful measurement of 200-300 trees. Because of the heavy losses since potting 700 trees in the spring, good comparative data for the seven species are not to be expected. Roeser will be engaged in the final cutting of the shelterwood plot in the Douglas fir study and on mapping, etc., in connection with the Station Forest. It is hoped to complete all field work before the end of the month.

DISTRICT 5 - CALIFORNIA DISTRICT

Work on the remeasurement of the permanent sample plots continued. A series of four 20-acre plots on the Stanislaus Forest have been completed during the month by Show, working with help from the Stanislaus Forest. On these plots, as on those on a similar excellent site remeasured earlier, a striking feature was the rapidity with which additional trees are growing into the 4-inch class. Although reproduction since logging has been rather slow, and there are considerable areas with no reproduction at all, real progress is being made on these areas.

During the month Dunning devoted considerable time to analyzing the material on tree space, a most important phase of the yield study. So far the two important tentative conclusions are that the better the site the smaller the amount of space required to produce a tree of a given diameter, and also that the greater the tolerance of the species the less is the space required. The data are unquestionably of real value in attacking the vexed problem of what constitutes a normal stand and in the yields of mixed stands.

Mr. Clapp visited the District from September 28 to October 2. A flying trip was made to the Stanislaus Forest where a number of the permanent plots were visited and the possibilities of the region as a center of work were discussed with the Supervisor.

NORTHEASTERN FOREST EXPERIMENT STATION

Field work on the major projects continued throughout the month. Behre spent most of the time in northern New Hampshire, while Westveld finished up his work in central and southeastern Maine, leaving the last of the month for the Adirondacks, and stopping en route to check up on the permanent sample plots on the Cherry Mountain sale area in the White Mountain National Forest. Meyer made a final effort to obtain additional material for the spruce-fir yield study, returning to the office the latter part of the month. Sufficient red spruce had been secured during the previous field season, with the exception of plots on the very poor and the very good sites, while spruce and balsam plots were poorly represented in the total number of plots. A number of places in Maine were visited, but only about 40 additional plots were secured, the higher age classes of pure, fully-stocked, even-aged white spruce and balsam being almost entirely lacking. Spaulding spent most of August and September in preliminary arrangements for establishing slash disposal plots, and in cooperative work on this problem at the Harvard Forest and the White Mountain National Forest. He also did some work in identifying slash-rotting fungi found in the White Mountains.

Dana attended the Yale Forest School Forestry Meeting and Field Day at Keene, New Hampshire, early in the month. After spending a few days in the office, he visited the Senior Camp of the Cornell Forestry School in the Adirondacks, and also spent several days going over the fire weather study with Stickel at the Sophomore Camp of the New York State College of Forestry at Cranberry Lake in the western Adirondacks. Two stations have been maintained there since the middle of July in a clear cutting and an adjacent area where the conifers have been removed from a fairly dense stand of northern hardwoods. At these two stations five readings a day have been taken on air and soil temperature, precipitation, wind movement, evaporation, air pressure, air humidity, and duff humidity. The season as a whole has been so wet that the duff has not dried out to any considerable depth and the fire hazard has been far below normal. Nevertheless, the surface duff, both in the open and in the forest, has frequently dried out to a humidity of between 5 and 10 per cent, although this has been for only comparatively short periods during the day, and the humidity during the night has almost invariably

gone up to at least 25 per cent. At a depth of one inch, the moisture content of the duff in the forest has never gone below this figure, and has done so only comparatively few times in the open. The correlation between relative humidity of the air and duff humidity has been very close, the two curves being for the most part almost parallel and reaching their minimum values at practically the same time. Relative humidities of from 40 to 50 per cent have frequently resulted in duff humidities of 5 to 10 per cent. Even fairly heavy precipitation appears to have an effect on the humidity of the surface duff for only 36 to 48 hours, and this period may be considerably reduced by abnormally high temperatures and heavy winds. Two new stations are to be established in young stands of second-growth yellow birch and aspen, and another station has been established in a virgin stand of spruce and hardwoods near the tract of the New York State Ranger School at Wanakena. Inflammability tests will be conducted so far as possible during October, and will be continued during the winter in the laboratory.

Colonel Graves paid the Station a brief visit about the first of the month, spending a few hours in going over the various sample plots on the Mount Toby tract which were established in connection with studies being carried on in cooperation with the Forestry Department of the Massachusetts Agricultural College.

Beal finished up his summer's work by a short detail to the Appalachian Forest Experiment Station, and will spend the school year at Syracuse working for his doctor's degree. Reynolds, who has been working as field assistant in mensuration studies, also left toward the end of the month to resume his forestry studies at Cornell.

APPALACHIAN FOREST EXPERIMENT STATION

General

Except for plumbing, the hanging of blinds, and interior painting, the work on the laboratory was finished in September. A short description of the building and its surroundings may therefore be in order. It is situated in an area of about 200 acres set apart for investigative purposes, constituting the lower end of Bent Creek Valley in the Pisgah National Forest, 20 minutes from Asheville by hard surfaced road. The building is of frame construction, 24 by 36 feet in size, with three large rooms, a dark room and a lavatory. The attic is as yet undivided and offers large well-aired and well-lighted space for sleeping and storage. The downstairs rooms are floored with oak, and ceilings and walls are of beaded pine ceiling. Plenty of light is provided by six double and three single windows. One of the rooms has a large fireplace.

The building rests on brick piers and has front and back porches. The sides are shingled. Plans, specifications, and costs can be furnished to any station which may contemplate building. The total cost is still several hundred dollars less than the prescribed limit. Considerable improvement remains to be done to the grounds, including the straightening and leveling of the short stretch of road between the laboratory and the Brevard highway. The small additional building erected this summer by cooperation of the Station and the Bureau of Entomology, and in use now as an insectary, was built in the form of a two-car garage. The water supply which was piped to the building site last June has been tested and found pure. A chemical analysis will be made later.

Miss Marie Simonson of the Washington office left Asheville September 20 after a month's work at the Station. Among the visitors were Lenthall Wyman and W. R. Hine, of the Southern Station, G. F. Gravatt of the Bureau of Plant Industry, W. J. Damtoft, Colonel Joseph Hyde Pratt, and Robert Sterling Yard, Vice Chairman of the Council on National Parks, Forests, and Wild Life. Dr. C. J. Humphrey was definitely assigned as pathologist at the Station, beginning September 1.

Frothingham attended the organization meeting of the Federal Business Association of Asheville on the 28th and was elected a member of the executive committee of the local association.

The Oak Study (TS-12)

Work on this project was continued by Mc Carthy and Averell about 20 days in September. During this period 35 plots were measured for yield in even-aged stands of oak in Kentucky and West Virginia. This made a total of 100 such plots measured during the present field season.

Practically the only even-aged stands of oak found were located on areas which had been clear cut for charcoal wood. Some areas had been cut the second time, producing a greater proportion of sprout growth than in stands which followed the cutting of the original forest.

Fire has injured many of these young stands and nearly all which have come up densely are found in a crowded condition after forty years. Growth in diameter has been reduced materially by crowding and fire scars have healed slowly. This has increased the chance of infection as evidenced by the common occurrence of decayed trees. Fire damage was more pronounced in northeastern Kentucky than it was in southern Ohio.

Several large areas of oaks were located through the office of the Shenandoah National Forest and a number of good plots were measured near Wardensville, W. Va. Second-growth over 90 years old was found on cuttings for the Crackwhip Furnace on Trout Run.

One excellent stand of white oak 150 years old was found north of Wardensville. This was on flat lands along the Capon River, and a cutting which amounted to a heavy thinning had been made fifty years ago. The stand is now 105 feet high and has trees up to 23 inches.

While in Ohio McCarthy visited State Forester Secrest and the State Experiment Station at Wooster. Through the courtesy of Mr. Secrest, some 700 or 800 volume measurements will be furnished the Station for the second-growth oak tables. McCarthy had the opportunity on this trip to see the Ohio Station's forty-acre arboretum which he had previously seen when it was being established by Mr. Secrest fifteen years ago. The arboretum is in a very thrifty condition, and has a fine representation of species. It is well worth a visit by foresters.

Thinning in Loblolly Pine (Mt-3)

On the conclusion of the oak study field work, McCarthy joined Alfred Akerman, of the Virginia State Forester's office, at Charlottesville, and they remeasured the shortleaf pine sample plots on the Thomas Nelson Page Estate in Hanover County, Virginia. These plots were thinned first in 1911. At this last remeasurement the trees in the plots were tagged.

Methods of Cutting and Natural Reproduction, Hardwoods (Mc-2)

Haasis spent about a week on the Shenandoah National Forest establishing quadrats for the study of reproduction after cutting (Mc-2) on the sample plots near Liberty Furnace, Virginia. Since there is a considerable percentage of chestnut in the unthinned plots, the Office of Forest Pathology, B.P.I., was interested in them in connection with their

current study of deterioration of blighted chestnut. Two of their men, R. B. Marshall and P. V. Siggers, with a car, helped with the establishment of these quadrats. Averell, too, spent his last week with us here before going to New Haven to take up graduate study at Yale.

Fourteen quadrats were staked out in the four sample plots, the total area of the quadrats in each plot being 2 per cent of the area of the plot. The large amount of reproduction found is of special interest. In the two plots cut over in the fall of 1924 there were over 40,000 sprouts and seedlings per acre, 69 per cent of which were less than a foot high. From one 9-inch chestnut oak stump there were 118 sprouts; 90 red maple sprouts originated from one group of sprout stumps. In one of the cut plots, two quadrats had at the rate of 55,000 small sweet birch seedlings per acre; the four quadrats of this plot, which had several large yellow poplars in and near it, and in which yellow poplars were left at the time of cutting, showed a poplar reproduction at the rate of 6,500 per acre.

After finishing the Shenandoah work, Haasis went with Marshall up to Hotel Mons on the Natural Bridge Forest, near Bedford, Va. Here they were joined by Supervisor Sears and by G. F. Gravatt and Mr. Clapper of the Office of Forest Pathology. The B.P.I. men chose sites for three permanent sample plots for their study of deterioration of blight affected chestnut. Haasis helped with the establishing of the plots and took notes for use in our study of chestnut replacement (M-3).

Drought Study (Pw)

The summer of 1925 has been exceptionally dry in parts of the southeastern United States. Summer forest fires, almost unheard of in the southern Appalachian region, have been numerous, and several towns and cities have placed restrictions upon the use of water. One of the results of this drought has been a leaf browning or early leaf fall and sometimes apparent death of forest trees in patches. Haasis spent a week making a study of these conditions in the Bent Creek section. A hundred trees, about half of them affected and half controls, were tagged and detailed records made of them. These will be studied further next year. Soil samples were taken at various depths in each group. It was found that to a depth of a foot or more the soil was so dry that it could not be brought up by the soil auger. Moisture percentage determinations have not been completed.

The leaf browning and early cast are more pronounced among younger trees than older ones. Dogwood, sourwood, and chestnut are apparently the most susceptible species, white ash, black locust and pignut hickory least. Trees with scars (where the cambium is lacking) apparently suffer the browning before trees which are not thus partially girdled. This is true even of 18-inch or 2-foot trees. Similarly, trees with burned bark seem to be the first to go. On large trees, at least, the browning commonly begins at the top, and the top branches may have dead leaves while those of the lower branches are still green. Sometimes there is a

partial browning of the individual leaves. It is the part furthest from the stem that is affected in such cases. The browned part is generally curled up toward the upper surface. This condition is especially common in dogwood.

The question has been raised as to whether these drought-affected trees are dead or whether the early leaf loss is simply a case of early dormancy which will enable the plant to survive the drought period. In some cases the cambium seems to be dead. In others, notably in sourwood, one of the first trees to lose its leaves, the cambium is apparently normal.

It is understood that the Office of Forest Entomology is planning to make studies this fall in the plots which have been established, and that Dr. Humphrey, of the Office of Forest Pathology, Bureau of Plant Industry, will possibly make a study of pathological phases.

Use of Paradichlorobenzene for Grub Control

Something over a year ago a local citizen called our attention to a lawn tree of his which was losing its leaves and wanted to know what the trouble was and what he could do about it. Later in the season the tree had apparently died and he had it removed. In the roots were found grubs which Dr. Craighead identified as the larvae of a prionid beetle.

It is characteristic of these borers that they are more destructive when the ground has a poor covering of humus or other mulch than on better sites. The owner of the property, therefore, had his lawn plowed up and reseeded during the winter. Nevertheless, last June another tree showed the same trouble. At the suggestion of Mr. St. George we recommended to the owner that he try treatments with paradichlorobenzene. This chemical has been successfully used against peach borers of the same genus. In order to be specific Haasis suggested about an inch of the chemical in the bottom of a hole about 3 inches wide and 4 inches deep, the chemical covered with earth, the holes placed about 2 feet from the tree trunk, four to a tree, and the chemical kept out of contact with the roots. The owner reported that he had followed these instructions and given the lawn a thorough soaking. Later in the season the use of water for watering lawns was prohibited. Nevertheless, the owner reports that the tree has now leafed out again and seems to be flourishing. Considering the facts that the summer has been unusually dry, that many lawn trees have succumbed and that the borers would be expected to be more injurious under such conditions, it seems likely that the paradichlorobenzene treatment was effective.

Defoliation of Black Locust

For several years past a species of leaf miner has been at work on the locust tree in parts of Virginia. As early as August the locust trees are quite conspicuous by the brown appearance of the crowns due to the eating away of the green tissues between the leaf veins. At Hotel Mons, Virginia, it is reported that the injury has been taking place for the past three years. While there this summer, Haasis made borings of several of the affected trees to see whether there was any apparent influence of the insect activities on the rate of growth of the trees. Cores were taken extending back 20 or 30 years, but there was no variation in rate of growth which could be correlated with the insect work. An ice storm about 1918 also seemed to have had no determinable effect upon the rate of growth.

Forest Insect Investigations

On September 16 W. Middleton, of the Washington office of the Bureau of Entomology, arrived in Asheville to aid in the study of the southern pine beetle and related problems and also to help in bringing the work to a close on October 1.

On September 18 R. A. St. George left for Bogalusa to obtain further records relating to a series of seasonal cutting experiments which are being conducted there in cooperation with the Great Southern Lumber Company. These experiments were begun December, 1924. Virgin longleaf pine trees were treated each month by girdling in various ways and by felling. Some of the girdled trees were observed to be attacked for the first time.

On September 23 St. George attended the annual meeting of the Southern Logging Association which was held in the Roosevelt Hotel, New Orleans, La. The Forest Service film, "Board Feet or Bored Lumber," was shown. Following the picture there was a lively discussion relating to the biology and methods of control of some of the important insects which are disastrous to the timber resources of the South.

On September 24 A. H. MacAndrews and James Beal went on a field trip in the western part of the State investigating tracts of timber which had died recently and found them infested by the bark beetles Ips and Dendroctonus frontalis, mainly the former. Suggestions for control were given.

On September 26 St. George attended a combined meeting which was held in Shreveport, La., of the (1) East Texas and (2) Tri-State Mill Managers Associations and the Southern Pine Association. Considerable information was received regarding the present status of the insect situation in Louisiana, Texas, and Arkansas. According to these reports over 300,000,000 feet of pine has died since the fall of 1924, a considerable portion of which died this spring. One company alone cut nearly

9,000,000 feet of timber which died since last fall. About 8,400,000 feet was cut at first, this spring 500,000 feet was cut off of the same tract, and recently 100,000 feet more has been removed showing how it continued to die, probably largely from the effects of the drought.

On September 27 St. George returned to Bent Creek preparatory to closing up the work under way there. McCarthy is continuing some of the records which will end about November 6.

On September 29 MacAndrews and Beal left for Washington and thence to Syracuse, where MacAndrews will receive his master's degree and Beal his doctor's degree.

On September 30 Middleton and St. George left Asheville for Washington.

IN PRINT

Wackerman, A. E. Minnesota's Only Hemlock Gone. (Jour. of Forestry. July-August, 1925)

Hofmann, J. V. Best Time for Sowing Silver Fir in the Nursery. (Jour. Agr. Res. Vol. 30, No. 3, August, 1925)

Brewster, D. R. & Larsen, J. A. Girdling as a Means of Removing Undesirable Tree Species in the Western White Pine Type. (Jour. Agr. Res. Vol. 31, No. 3, August, 1925)

Hofmann, J. V. Laboratory Tests on Effect of Heat on Seeds of Noble and Silver Fir, Western White Pine, and Douglas Fir. (Jour. Agr. Res., Vol. 30, No. 2, July 15, 1925)

Appalachian Station - Tree Problems to be Worked Out in the Woods. Asheville (Sunday) Times, Sept. 27. (Interview descriptive of Bent Creek Laboratory, illustrated)

MANUSCRIPT NEWS NOTES

Logging: The Key to Forestry, R. D. Forbes. (Address before the Southern Logging Association, September 23, 1925.) (To Southern Lumberman, Lbr. Trade Journal, and American Lumberman.)